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Ana Rita de Castro Vieira

Parental Education contributes to a better sleep in the first year of life

A systematic review of the literature

Março, 2018

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Medicina Geral e Familiar

TÍTULO DISSERTAÇÃO

Parental Education contributes to a better sleep in the first year of life: a systematic review of the literature

ORIENTADOR

Prof. Doutor Paulo Alexandre de Azevedo Pereira dos Santos

COORIENTADOR (se aplicável)

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Muito obrigada! ...

Parental Education contributes to a better sleep in the first year of life: a systematic review of the literature

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Abstract

The first year of life can be overwhelming. One of the major problems parents face is infant's crying and sleeping habits, leading many times to exhaustion, with implications in their sleep, mood, marital satisfaction and mental health. Information is crucial.

The aim was to review the relevance and to assess the impact of parental education in sleep problems in the first year of life. We conducted a systematic review, using keywords reference to "parental education", "parenting", "sleep hygiene", "infant" and "newborn", in Medline via PubMed and Scopus, including Embase, looking for original articles on parental education and infants' sleeping in the first year of life, in the last 10 years in English and Portuguese.

Nine original articles were included in our review. Results suggested that preventive intervention improves infants' sleeping quality. Parental education programs included infant sleep patterns, parental behaviour and strategies facilitating self-soothing. Most successful strategies were placing down the infant while still awake, and to minimize parental responsiveness, by active extinction and graduated extinction techniques. Cognitive-behavioural interventions proved to improve both parents and infants' symptoms.

It is important to include in medical practice parental education on children sleeping pattern and parents' behaviours in children's health routines. It proved to be a cost-effective strategy of increasing empowerment of families to deal with the problem. Formal education of medical doctors is crucial to attend this goal.

Keywords: Parental Education, infant sleep, depression, fatigue, first year of life

Introduction

Sleep problems such as difficulty in falling asleep, frequent night awakenings, difficulty self-soothing and crying are reported by most parents as challenging in the transition to parenthood (Crichton & Symon, 2016).

Inadequate sleep negatively influences infant behaviour, cognitive, physical and socio-emotional development, leading to a diminished ability in emotional regulation (Hall et al., 2015). Fatigue, poor sleep quality and distress are frequent findings. Parents described extreme stages of tiredness with poor parental sleep adding to exhaustion in the first 6 months of life (Loutzenhiser, McAuslan, & Sharpe, 2015).

Sleep problems are present in 30% of infants, depending on how parents define infants' sleep as a problem. Most commonly, parents identify infant night waking with crying beyond six months old as problematic (Meltzer, Plaufcan, Thomas, & Mindell, 2014). Persistent sleep problems can also contribute to postnatal depression, parental suffering and reduced overall health, even in mothers with no depression antecedents (Martin, Hiscock, Hardy, Davey, & Wake, 2007). Moreover, maternal fatigue at 12 months after birth predicted depression scores at 18 months (Giallo, Gartland, Woolhouse, & Brown, 2016). Mothers with higher levels of depression-related symptoms have reported more infant night waking and more maternal worries about adequately responding to their infants' needs at night (Teti & Crosby, 2012). Worries are related with cognitions about infant sleep, particularly doubts about managing infant sleep, difficulty with settling sleep limits and anger at infants' demands around sleep (E. Loutzenhiser, L. Hoffman, & J. Beatch, 2014).

Studies on children's behavioural sleep problems demonstrated the efficacy of behavioural interventions, with significant results that last three to six months after implementation (Mindell et al., 2006). In USA, 14% of mothers experience postnatal

depression (Dave, Petersen, Sherr, & Nazareth, 2010). Similarly, in Portugal, 12,4% of mothers has post-natal depression one week after birth, and 13,7% three months post-partum (Costa, Pacheco, & Figueiredo, 2007). These high rates of maternal depression interfere with the creation of a secure mother-to-child attachment and may cause harmful consequences on the cognitive and emotional growth of the infant (Beck, 1998).

The first year of life is a difficult period of adaptation. Parents need to learn how to deal with the infant's cry and sleep, the two major problems described in the literature. They feel overwhelmed and frequently exhausted and stressed, with repercussions in their own sleep, mood and marital satisfaction. These are the main reasons for them to seek help with their family doctors, paediatricians and assistant nurses (Eckerberg, 2002). Providers must characterize exactly the infant sleep quality, its physiology and development implications (Mindell, Moline, Zendell, Brown, & Fry, 1994).

Although 96% of American paediatricians consider a crucial duty to provide information about infant sleep to the parents, only 18% have formal education in this topic (Faruqui, Khubchandani, Price, Bolyard, & Reddy, 2011). Programs targeting to avoid infant sleep difficulties focus on parental education about baby self-soothing strategies, healthy sleep/wake patterns, little stimulus at night and rising periods among wakening and night feds (B. G. Symon, Marley, Martin, & Norman, 2005). Implementing programs on healthy sleep and crying patterns, and encouraging infants to self-soothe may decrease concerns about infant sleep and crying troubles (Tse & Hall, 2008). However, parents are unsatisfied with counselling obtained from health providers and demand for more information that is acceptable and realistic for practice purposes (Armstrong, Quinn, & Dadds, 1994). However, the way parents

recognize and accomplish behavioural intervention is not totally comprehended (Mindell, 1999).

The literature presents several behaviour strategies helping parents to promoting better infant sleep: positive routines; extinction; gradual or modified extinction and attachment parenting style. Positive routines relates with placing the infant to sleep at consistent hours as same as to wake in the morning, establishing the infant bed as the appropriate place to fall asleep and avoiding associations with behavioural patterns like being rocked, fed or having parents at their bed until they fall asleep. Extinction is a strategy where parents put their infant in bed to sleep in a defined schedule ignoring them until next morning, without checking for potential harm. The method is based in removing the reinforcement for the sleeping problem behaviour. Gradual extinction refers to ignoring infants in their bed for increased periods of time, according to age, temperament of the child and parents' judgement related to the tolerance of their infant to crying. Short interventions of 15 seconds to one minute are allowed, where parents may calm down their child. The aim is to promote infant's ability to self-soothe and fall asleep alone (Kuhn & Elliott, 2003). Extinction-based strategies have been used for half a century, since studies had demonstrated that parental attention reinforce problematic behaviour, diminishing when parents stop attending the child at first demand (Williams, 1959). However, recent studies don't support this technique, showing that the perception of abandoning of the child leads to a great anxiety in parents, and feelings of guilt. Consequently, gradual or modified extinction techniques were introduced to alleviate this guilty perception. Instead of a full extinction program, parents are invited to listen infants cry after a predetermined period, increasing intervals over time (Crichton & Symon, 2016). Attachment parenting style is another opposing method, settled from the values of attachment

theory. It consists on answering rapidly and caringly to the emotional and physical needs of the infant to ease safe attachment (Bowlby, 1978).

There's a prompt need of sleep education programs both in the community or in the primary care settings, as they offer an unique opportunity to improve the insufficient sleep education, with better health and well-being (Gruber, Cassoff, & Knauper, 2011). Working in this gap of parental information leads to increasing awareness and creates formal and systematic knowledge to improve programme design, delivery and effectiveness. Improving sleeping quality leads to better infant health, with lower costs for parents and for health system.

The aim of this review was to assess the impact of parental education in sleep problems in the first year of life, establishing the relevance of this intervention.

Methods

The results of this systematic review are reported according to PRISMA statement (Mother D, Liberati A, Tetzlaff J, & G, 2009).

Search procedure

A search strategy was developed to identify studies correlated to parental education and sleep from birth to the age of 12 months. We searched in Medline via PubMed and Scopus, which includes Embase, for relevant papers published in the last 10 years, whose title, abstract or keywords included reference to "parental education", "parenting", "sleep hygiene", "infant" and "newborn". The search was limited to English and Portuguese language articles. Titles and abstracts were examined to obtain potential relevant articles.

Exclusion criteria

We excluded non-original articles and those involving premature, infants with biological causes or sleep problems, developmental incapacity or special needs.

Study selection and data extraction

After the systematic search we identified possibly eligible studies and imported them into an Endnote® library. Duplicates were removed. Titles and abstracts were analysed for eligibility and explored full-text articles for potential inclusion. Data were extracted to an excel base. Authors of potentially eligible studies were contacted when needed and reference lists examined for additional articles.

We identified 702 papers (Fig.1) in the first round. After analysing titles and abstracts, we selected 40 articles for full-text reading. The final results included six articles, plus three papers found in references' lists. Not appropriate protocol methods; infant age and unmatched aims with our objectives were the main reasons for exclusion of the articles.

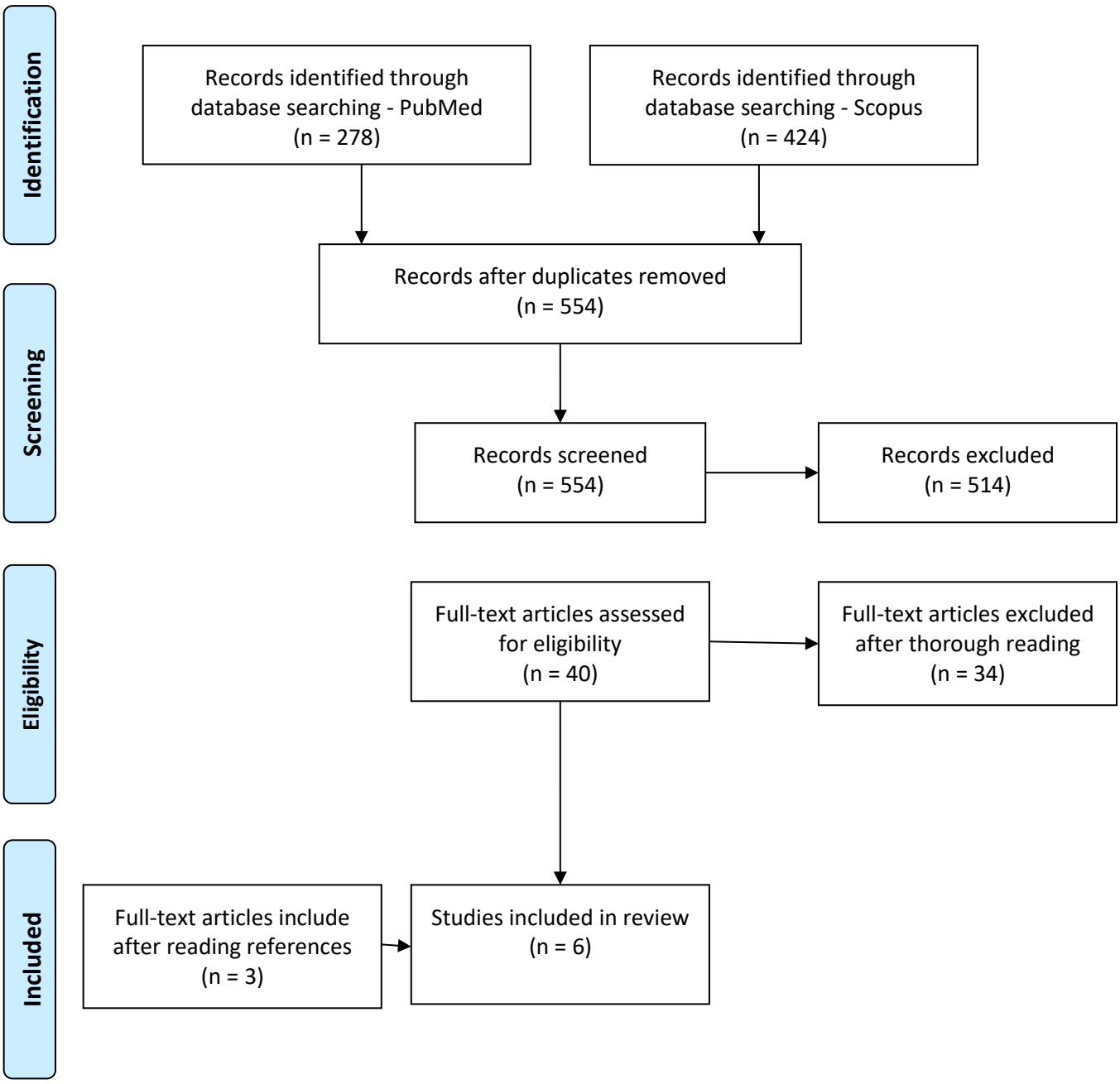

Figure 1 - Selection and exclusion procedure adapted from PRISMA (Mother D et al., 2009)

Quality assessment

The quality was assessed with the Cochrane tool for assessing risk of bias (Higgins & Green, 2011). It was used to rate each study as “low”, “medium” and “high” chance of bias related to selection, performance, detection, attrition and reporting bias.

Results

Database results

This review included six articles from search strategy and three from references’ lists.

Study characteristics

We summarized the main aspects of the nine studies included in this review as shown in table one. Articles were published between 2006 and 2016. The majority of studies (n=4) were conducted in Canada (Hall, Clauson, Carty, Janssen, & Saunders, 2006; Hall et al., 2015; E. Loutzenhiser et al., 2014; Tse & Hall, 2008), two were conducted in the USA (Eisenberg et al., 2015; Paul et al., 2016), two in Australia (Hiscock et al., 2007; Hiscock et al., 2014) and one in Japan (Adachi et al., 2009). Most of the trials analysed have one intervention group and one control group. Intervention was delivered orally (group presentation), written (booklet), by video, chart completion and telephone. Themes were about normal infant sleep, bedtime routine, sleep location, behaviour techniques, setting limits, night waking, consequences of insufficient sleep for infants and parents, importance of daytime routines and negative sleep associations. Control groups received no information on infant sleep (Adachi et al., 2009), information about safety (Hall et al., 2015; Paul et al., 2016) or common precaution (Hiscock et al., 2007; Hiscock et al., 2014). We found two qualitative studies about parental perceptions of advice received and effectiveness of a

behavioural intervention (Eisenberg et al., 2015; E. Loutzenhiser et al., 2014). Globally, the nine studies included 3.312 participants.

Table 1 – Summary of included studies in this systematic review

Study	Age	Participants (N)	Objective	Interventions	Outcomes
(Adachi et al., 2009) - Prospective cohort study, cluster sampling controls - Primary care setting - Japan	4 months	Intervention group: 99 50% male infants 39 gestational weeks Maternal age 32 years 99%married Control group: 95 55% male infants 39 gestational weeks Maternal age 32 years 97% married	Reduction of maternal undesirable behaviours; Reduction of night waking and crying at night.	Intervention group: delivery of a booklet after a health check-up and participation in a brief 10-minute group presentation with guidance on infant sleep. Control group: participants receive no information on infant sleep and provided with only the standard parenting educational information supplied to all visitors at the health check-up session.	Reduction of maternal undesirable behaviours *("feed or check diaper promptly", "hold and soothe immediately after night waking")* Prevention of increase night waking
(Paul et al., 2016) - Randomized trial - Home visit and health centre - USA	3,16,28 and 40 weeks 1 year (infants)	Intervention group: Responsive parenting (RP) - 140 54%male infants 40 gestational weeks Maternal age 29 years 73% married Control group: 139 50% male infants 40 gestational weeks Maternal 29 years 78% married	Improve sleep behaviours and duration.	Intervention group: messages and guidance within bedtime routine, sleep location and behaviour and night waking (written and video) Control group: information about crib safety and prevention of sudden infant death syndrome, development changes and carbon monoxide poisoning.	Compared with controls, intervention groups were less likely to have prolonged bedtime routines (>45min) and more likely to have earlier bedtimes at 16 and 40 weeks. There were less likely to be fed immediately before bed and more likely to self-soothe to sleep. At 8, 16 and 40 weeks, RP group nocturnal sleep duration was longer by 35, 25 and 22 min, respectively. Sleep duration at 1 year was similar between groups.
(Hall et al., 2015) - Randomized control trial - Home visit and health centre - Canada	6-8 months	Intervention group: 117 64% male infants Parents age 35 years 97% married Control group: 118 48% male infants Parents age 35 years 97% married	Determine the efficacy of a cognitive-behavioural group intervention, offered through public health nurses.	Intervention group: oral and written information about healthy infant sleep, consequences of insufficient sleep for infants and parents, setting limits around infant sleep, the importance of day time and sleep habits and negative sleep connotations. Control group: oral and written information about infant safety risks.	Reduced number of nighty wakes or parent report of sleep problem severity; Improvement in parental depression, fatigue, sleep, and parental cognitions about infant sleep
(Tse & Hall, 2007) - Descriptive, exploratory study - Home visit	6-12 months	14 families mean age: 34 years	Describe parents' perspectives about implementing sleep intervention, its effectiveness and any problems associated with	Intervention in previous study – EIARBSP- 2h teaching session with information about infant	Parents altered their evaluations about sleep and parenting styles They experienced many challenges and inadvertent

- Canada			participation in the study.	development, normal sleep behaviour, positive daytime and bedtime routines, negative sleep associations, a controlled comforting intervention and ways which parents could care for themselves.	benefits They welcomed a structured framework for assisting with sleep problems The parents fitted intervention strategies into their realities.
(Eisenberg et al., 2015) - Stratified 2-stage clustered design - Hospitals - USA	2-6 months	1031 mothers 52% male infants 53% of mothers with 20-29 years 37% of mothers with college degree 63% of mothers multiparous	Determine whether mothers report receiving advice from doctors, nurses, family and media. Describe the extent to which advice is consistent with current recommendations.	None (Interviews)	Doctors are the most prevalent source of reported advice; 20% of mothers reported no doctor advice for sleep positioning and more than 50% reported no advice regarding sleep location; Advice from nurses were similar to doctors; Advice from family or media was 20 to 56% for all care practices and advice was often inconsistent with recommendations; Black and Hispanic mothers and first-time mothers were more likely to report recommendation consistent advice.
(L. Loutzenhiser, J. Hoffman, & J. Beatch, 2014) - Internet based study - Canada	6-12 months	411 parents 53% male infants Mean age – 32 years 97% married	Determine parents' use of graduated extinction and their perceptions of its effectiveness	None	Almost half of the parents surveyed reported using graduated extinction with their infants and the majority of these parents began using it before their infants were 6 months old; Parents in the community experienced less success with graduated extinction than parents in clinical setting, with almost half reporting no reduction in infant night waking. Significant predictors of success were parental cognitions regarding stress and support.
(Hall et al., 2006) - Quasi-experimental one group pre-test and post-test design study - Canada	6-12 months	39 families Mean age – 35 years 84,8% have only 1 child 48,8% completing 17-20 years of education	Evaluate the consequences of sleep mediation for infants from 6 to 12 months old	Information about infant sleep and tactics for sleep problems on 2h classes of up to 6 couples, feeding-sleeping and controlled comforting charts completion and bi-weekly telephone call for 2 weeks. Teaching session was about: normal infant sleep; negative	Significant improvement in parents' well being, depressed mood, fatigue and sleep quality. Decreases in parental anger about their infants' sleep and increases in their confidence as parents with consequently more positive interactions with their infants.

				sleep associations; bedtime routines; organized daytime schedules and naps; controlled comforting and take care about themselves (parents). Assessment through questionnaires about parental perceptions of depression, parental sleep quality, sleepiness and fatigue; also cognitions about infant sleep problems and marital adjustment.	
(Hiscock et al., 2007) - Cluster randomized trial - Maternal and child health centres - Australia	7 months	328 mothers 89% infant male Maternal age 33 years 97% married	Determine whether a community-delivered intervention aiming infant sleep problems improves infant sleep and maternal well-being and to report the costs of this approach to the healthcare system.	Behavioural strategies delivered over individual structured maternal-child health nurses consultations versus usual care.	Prevalence of infant sleep problems was lower in the intervention than control group at 10 months and 12 months. Edinburgh Postnatal Depression Scale (EPDS) scores indicated less depression at 10 months and 12 months SF-12 mental health scores indicated better health at 10 months and 12 months.
(Hiscock et al., 2014) - Randomized control trial - Child centres - Australia	4-6 months	781 infants 56% male 87% 37-41 weeks of gestation Maternal age 33 years 96% married	Evaluate a prevention program for infant sleep problems and postnatal depression.	Intervention group: information about healthy infant sleep, cry patterns, soothing methods, biological causes of crying and parent learning of care of them selves, via booklet and DVD, telephone consultation and parent group. Control group: well-child care	Intervention caregivers reported a slightly greater reduction in depression symptoms between 4 and 6 months and fewer symptoms at 6 months. Intervention caregivers were less likely to attend night waking, change formulas to manage their infants' problems and had less doubt, difficulty setting limits and concerns about safety with respect to infant sleep. Reductions of sleep problems in infants who are frequent feeders.

Outcomes measured

Primary outcomes described concerns associated with fewer prolonged bedtime routines (>45 min.) and earlier bedtimes, ability to self-soothe, longer nocturnal sleep duration and less parental reports of sleep severity problems.

Secondary outcomes were related with prevention of an increase in night waking, enhancement in parental depression, exhaustion, sleep and perceptions about infant sleep. After intervention, parents altered their perceptions concerning sleep and childrearing styles, using a framework for assisting sleep problems and adapt to their reality. Reduction of maternal undesirable behaviours like *"feed or check diaper promptly"* and *"hold and soothe immediately after night waking"* was also described.

Quality assessment of included studies

We organized the quality assessment chart as shown in table two. Globally, the studies included in this review presented good quality evaluation with low to moderate risk of bias.

Table 2 – Quality assessment of the included studies adapted from Cochrane tool for assessing risk of bias (Higgins & Green, 2011)

Study	Selection bias	Performance bias	Detection bias	Attrition bias	Reporting bias
(Adachi et al., 2009) - Prospective cohort study, cluster sampling controls - Primary care setting Japan	A	B	B	A	A
(Paul et al., 2016) - Randomized control trial - Home visit and health centre USA	A	B	B	A	A
(Hall et al., 2015) - Randomized control trial - Home visit and health centre Canada	B	B	B	A	A
(Tse & Hall, 2007) - Descriptive, exploratory study - Home visit Canada	B	A	A	A	A
(Eisenberg et al., 2015) - Stratified 2-stage clustered design - Hospitals USA	B	A	A	A	A
(L. Loutzenhiser et al., 2014) - Internet based study Canada	B	B	A	A	A

(Hall et al., 2006) - Quasi-experimental one group pre-test and post-test design study Canada	B	B	A	A	A
(Hiscock et al., 2014) - Randomized control trial - Child centres Australia	A	A	B	B	A
(Hiscock et al., 2007) - Cluster randomized trial - Maternal and child health centres Australia	A	A	B	A	A

Parental Education Programs contribute to better sleep and better parenting

Addachi et al. studied 99 mothers of infants who received a booklet with information about positive sleep routines, desirable and undesirable parental behaviours to place the infant back to sleep after night waking in their routine visit to doctor. The aim was to promote extinction of night waking and improve difficulties in settling to sleep. Desirable strategies included waiting for a short time without responding when the infant cries at night and silently checking bed and clothes of the infant. Undesirable behaviours were the prompt feeding or immediate checking of the infant's diaper after crying as well as prompt holding and soothing. To encourage better sleep, authors recommended increasing daytime play activities, involving abundant visual and hearing stimulation, introducing a regular waking time and bedtime, avoidance of stimulating activities later in the evening, establishing a specific place to sleep at a specific time, setting a bedtime routine and encouraging the infant to fall asleep alone. Intervention group presented less undesirable behaviours, with a significant decrease of *"feed or check diaper promptly"* behaviour from 66,7% to 36,4% and *"hold and soothe immediately"* behaviour from 22,7% to 10,6% versus an increase in control group. There was a meaningful rise of desirable parental behaviours, like *"play with infant or stimulate in the daytime"*, *"settle to sleep at the same place"* and *"set regular bedtime and waking time".* Generally, the proportion of infants who showed *"difficulty settling"* decreased in both groups (Adachi et al., 2009).

Paul et al. conducted another study, with 270 participants recruited after delivery from one maternity ward. Intervention group was contacted at home at three, four, 16, 18 and 40 weeks, looking for information about infant behavioural states: drowsy, sleeping, fussy and alert. Parents received material by mail, including video

describing alternative soothing strategies, while control group received information just about safety. One year after delivery the evaluation assessed bedtime routine, sleep location and behaviour, night waking and personalized sleep profile. After intervention, more infants were given time to self-soothe to sleep (from 35% to 16%) making them more able to fall asleep alone, without parental intervention. The bedtime routines reduced to less than 45 minutes before bed, infants were less likely to be fed as the last activity of their bedtime routine, less infants felt asleep being held, the self-soothing to sleep increased at 16 and 40 weeks. The intervention group showed also an increase of nighttime sleep duration all over the first year, disappearing after one-year evaluation, although they remained more likely to sleep the recommended 12 to 14 hours per day. Intervention also improved parents' behaviour, reducing the feeding immediately before bedtime at 16 and 40 weeks, and using alternative strategies from picking up and holding/rocking their children for soothing to sleep at 40 weeks (Paul et al., 2016).

Another study assessed the effect of a sleep intervention, including group education sessions with information about infants' patterns, negative sleep associations, unrealistic expectations about sleep, effects of sleep loss on infants and parents, and strategies to reduce night waking. Parents were called by phone twice a week for two weeks. The intervention consisted in a strategy of controlled comforting with two to ten minutes taken to console the infant and then leaving the room for incremental intervals of two minutes up to ten minutes, aiming to promote infant self-settling. Control group was taught just about infant safety protection. The intervention group presented fewer infants' night-time awakening and reported less severe sleep problems (at six weeks, four % in the intervention group compared to 14% of controls). Parents showed significant less fatigue, better sleep quality and

improvement in depressed mood. Also, the doubts about managing infant sleep, comfort managing sleep and feeding, and comfort setting limits around infant sleep improved significantly (Hall et al., 2015).

Eisenberg et al. interviewed 1.031 mothers to know how they get information for caring of their babies. Twenty per cent didn't get any advice from doctors about sleep positioning and beyond 50% stated no guidance concerning secure sleeping places. Advices from nurses were similar to doctors and guidance from family or media was pointed by 20 to 56% for all care practices. It was common to find inconstant advices (Eisenberg et al., 2015).

Loutzenhiser et al. inquired 411 parents. Almost half of them used gradual extinction with their infants, the majority of which starting before six months old. However, parents reported little success as less than half of children got any benefit on night-waking, especially in the community based population, comparing with clinical setting population (E. Loutzenhiser et al., 2014). Parental cognitions regarding stress and support were significant predictors of success (Kuhn & Elliott, 2003).

Hall et al. evaluated consequences of sleep mediation for infants from six to 12 months old in a group of 39 families facing infants' sleep problems. Intervention consisted on delivering material concerning infant sleep and techniques for sleep difficulties on 2h classes of up to six couples, feeding-sleeping and controlled comforting charts completion, and bi-weekly telephone call for two weeks. Teaching session covered the topics about normal infant sleep, bad sleep connotations, bedtime habits, planned daytime plans and naps, organized reassuring, and time available to parents. Assessment was carried out through questionnaires about parental perceptions of depression, parental sleep quality, sleepiness and fatigue, perceptions about infant sleep difficulties and matrimonial adjustment. Authors described

meaningful enhancement in parents' wellbeing, depressed mood, fatigue and sleep quality. They also found a reduction in parental anger about their infants' sleep and an increase in their self-confidence as parents, both associated to more positive interactions with infants (Hall et al., 2006). Two years later, Tse and Hall reassessed 14 of the 35 families who attended the previous intervention, looking for parental perceptions of the specific sleep mediation and any problem linked with participation in the study. Parents mentioned that the information helped to understand the necessity to facilitate their babies to self-soothe, learning that good sleep behaviour and routines leads to a healthier and happier child. Most of the parents read extensively about sleep interventions and a lot of theories about it, but their struggles hadn't accomplished any results while they felt overcome by their babies' cries. Using step-by-step guidelines helped parents to *"gain a framework to tackle sleep problems"*, such as controlled comforting, avoiding feeding to sleep, short naps and co-sleeping, delaying their reply to a partially awake baby or using progress notes to track a baby's pattern of activities. Parents also pointed the *"unanticipated changes resulting from using the strategies in the study"*, related to the notion that they were "normal" parents and their infants' problems were common and modifiable. Thus, they felt empowered for changing their parenting styles, using more routine-oriented schedules rather than totally child-directed approach. Perseverance was the biggest challenge, because parents were asked to refrain from using what they considered easier methods in dealing with crying babies, like cuddling, rocking or breastfeeding to sleep. They identified difficulties attaching to routines, dealing with the effects on others, adapting the intervention to the baby's development, facing with family circumstances that interfered with routines, and dealing with childcare providers who undermine the intervention. Sleep-problems relapses happened with disruptions of

routines, as illnesses, teething or vacations, and they could be very discouraging, bringing the fear of failing in the intervention or being judged. Finally, they mentioned *"parents' support systems, expectations and inadvertent benefits of the study"* describing varying needs for support. Some of them received help from family members, such as cooking or babysitting, while others received psychological support through phone call or meetings with friends and family, helping to deal with the feeling of being emotionally isolated (Tse & Hall, 2008).

Hiscock et al. conducted a study with 781 babies born at 32 weeks or latter in 42 health-child centres. Intervention families were mailed with a booklet and a DVD containing material concerning healthy infant sleep, crying patterns, soothing methods, crying biological reasons and parents learning to care of them selves. They also received a phone contact at six-eight weeks and participated in parent groups at 12 weeks. Both encouraged parents to discuss crying or sleeping problems and develop problem-solving strategies. The control group received usual health-child care at health services. Intervention caregivers reported a slightly reduction in depression symptoms between four and six months and fewer symptoms at six months. They were less likely to attend night waking, more likely to change formulas to manage their infants' problems, and they had less doubts and difficulty setting limits and less concerns about safety sleep. The authors reported reduction of sleep problems in infants who wanted to eat frequently at night (Hiscock et al., 2014).

Hiscock et al. studied the impact of a community-delivered intervention aiming baby sleep difficulties, increasing infant sleep pattern, maternal well-being and on the costs to the healthcare system. They followed 328 mothers, between four and 12 months years old, implementing behavioural strategies delivered by maternal-child nurses versus usual care. Mothers could choose between two behavioural methods:

controlled crying, where parents gradually increased the response time to their infant's cry, or camping out, consisting of being seated with the baby till they felt sleeping and progressively eliminating parental presence. Mothers were invited to write sleep diaries to simplify identification of sleep problems and enhancements and to support settlement of further goals. Prevalence of infant sleep difficulties and mother's depression indicators were inferior in the intervention group, at 10 months and 12 months, with better quality of life and acceptable costs, slightly lower in intervention group, although not significant (Hiscock et al., 2007).

Discussion

We found few articles studying the relation between parental education and sleep problems in the first year of life in healthy children.

Our results suggest that active preventive intervention improves sleeping quality in infants, providing education about infant sleep patterns, parental behaviour and strategies to facilitate self-soothing. The key of success relies in direct advice to place the infant in bed while still awake, and to minimize parental responsiveness, based on the efficacy of active extinction and graduated extinction techniques. Moreover, interventions lead to fewer doubts of parents about managing their infants' sleep problems. These findings support the relevance of introducing educational interventions in our preventive approach for infants' health follow-up, although some suggestions that this is a transitory problem, self-extinguishing over time, the neuronal and physiology maturation evolves (Crichton & Symon, 2016; Kuhn & Elliott, 2003; Mindell, 1999; Mindell et al., 2006; B. G. Symon et al., 2005; Williams, 1959). Nevertheless, infants who received behavioural interventions presented more

consistency in improvement of sleeping quality (Gradisar et al., 2016; Mindell et al., 2006).

Our review shows that cognitive-behavioural interventions reduce the number of night awakening and sleeping problems' severity as reported by parents, with less parents' symptoms of depression, fatigue, or sleeping pattern, (Hall, Moynihan, Bhagat, & Wooldridge, 2017; B. Symon, Bammann, Crichton, Lowings, & Tucsok, 2012) and better knowledge about infant sleep. The information can be delivered orally or in written forms, individually or in-group and should be adapted to each case accordingly the providers experience and the population profile (Santos et al., 2014). The distribution of written material for parents has a positive relation with sleep improvement (Gruber et al., 2011) with the advantage of being available in the future, allowing further reviews when effectively needed.

The main strategies for advising are to leave the infant in bed while still awake allowing the self-settlement, to reduce the parental interaction to the minimum, to strengthen the difference between day-time and night-time, and to anticipate the feeding schedule for the end of the afternoon to increase feeding intervals at night.

Although the implementation of educational interventions, both in office visits as in structured group or community actions, is time consuming and consequently costs money, this investment may create value to parents and to health system, being cost-effective. Parents benefit from better understanding of sleeping patterns of their children, promoting the establishment of their own night-time autonomy, with less worries and illness. Health services and providers benefit from that better perception of health status, reducing the number of unnecessary visits, and promoting better satisfaction indexes. However, to be successful in teaching patients, providers must train how to do it, making necessary the introduction of educational programmes for

their own (Santos, Alves, & Simoes, 2017). The need of formal education about sleep programs is crucial to empower health providers for acknowledgment and assessment of sleep troubles, for choosing proper mediations, and for providing an effectively support for families (Gruber et al., 2011).

Conclusion

This systematic review collected the evidence of the relevance of a medical practice towards the improvement of parental education about sleep problems. It reduces undesirable maternal behaviours, making the infant more likely to self-soothe, reducing the number of night awakenings, reducing parental symptoms of depression, fatigue and sleeping disturbances and improving parental cognitions about infant sleeping, within acceptable costs.

Infants' health visits must include questions about sleeping pattern of children and their parents' behaviours, and counselling for the insertion of strategies for improving the perceived problems. Having pre-existing written forms, both in conventional paper and in electronic web-based forms, is a facilitator. Community or group interventions may be useful as they facilitate parenting process and give important peer support.

Compliance with Ethical Standards

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